

## WHAT IS CLAIMED IS:

1   1. A motor torque control system for a vehicle equipped  
2   with a motor, comprising:  
3         a vehicle speed sensor that detects a vehicle speed;  
4         an accelerator opening detector that detects an  
5   opening of an accelerator of the vehicle;  
6         a brake depression detector that detects a brake  
7   manipulated quantity indicative of a depression state of  
8   a brake of the vehicle; and  
9         a control unit coupled to the vehicle speed sensor,  
10   the accelerator opening detector, and the brake  
11   depression detector, the control unit being arranged to  
12   bring a motor torque of the motor to zero when the  
13   vehicle speed is lower than a predetermined speed, when  
14   the accelerator opening is substantially zero, and when  
15   the brake depression state is set at a braking increasing  
16   state of increasing a braking force of the vehicle, and  
17   to generate the motor torque according to the brake  
18   manipulated quantity when the brake depression state is  
19   set at a braking decreasing state of decreasing a braking  
20   force of the vehicle.

1   2. The motor torque control system as claimed in claim  
2   1, wherein the control unit is further arranged to  
3   control the motor torque when one of the braking  
4   increasing state and the braking decreasing state is  
5   maintained for a predetermined time period.

1   3. The motor torque control system as claimed in claim  
2   1, wherein the control unit is further arranged to  
3   increase a rate of change of the motor torque according  
4   to the increase of the brake manipulated quantity when

5 the brake depression state is set at the braking  
6 decreasing state.

1 4. The motor torque control system as claimed in claim  
2 3, wherein the control unit is further arranged to  
3 generate the motor torque under the braking decreasing  
4 state only when the brake manipulated quantity is greater  
5 than a predetermined value and when the vehicle stop  
6 state is maintained for a predetermined time period, and  
7 to generate the motor torque regardless of the vehicle  
8 speed when the brake manipulated quantity is smaller than  
9 or equal to the predetermined value.

1 5. The motor torque control system as claimed in claim  
2 1, wherein the braking increasing state includes a state  
3 that a time rate of change of the brake manipulated  
4 quantity is a positive value, and the braking decreasing  
5 state includes a state that the time rate of change of  
6 the brake manipulated quantity is a negative value.

1 6. The motor torque control system as claimed in claim  
2 1, wherein the control unit is further arranged to  
3 determine the motor torque  $tTrq$  generated according to  
4 the brake manipulated quantity from the following  
5 expression (1):

6 
$$tTrq = (tTrq_{Creep} - tTrq_{(n-1)}) \times \text{rate} + tTrq_{(n-1)} \quad \text{---(1)}$$
  
7 where  $tTrq_{(n-1)}$  is a torque obtained in a previous  
8 execution,  $tTrq_{Creep}$  is a creep running target torque,  
9 and rate is a variable which decreases from 1 to 0 in  
10 approximately inverse proportion according to the  
11 increase of the brake manipulated quantity.

1   7.   The motor torque control system as claimed in claim  
2   1, wherein the control unit is further arranged to bring  
3   the motor torque to zero with a steep gradient of the  
4   motor torque to the brake manipulated quantity  
5   which is largely steeper than a gradient of the motor  
6   torque to the brake manipulated quantity, which is  
7   employed when the brake depression state is set at the  
8   braking decreasing state.

1   8.   A method of controlling a motor torque of a motor  
2   for driving a vehicle, comprising:  
3         detecting a vehicle speed;  
4         detecting an opening of an accelerator of the  
5   vehicle;  
6         detecting a brake manipulated quantity of a brake of  
7   the vehicle;  
8         bringing the motor torque to zero when the vehicle  
9   speed is lower than a predetermined speed, when the  
10   accelerator opening is substantially zero, and when the  
11   brake manipulated quantity is increasing; and  
12         generating the motor torque according to the brake  
13   manipulated quantity when the brake manipulated quantity  
14   is decreasing.

1   9.   A motor torque control system for a vehicle,  
2   comprising:  
3         a motor that generates a motor torque for driving  
4   the vehicle;  
5         a vehicle speed sensor that detects a vehicle speed;  
6         an accelerator opening detector that detects an  
7   accelerator opening of an accelerator of the vehicle;

8        a brake depression detector that detects a brake  
9 manipulated quantity of a brake of the vehicle; and  
10        a control unit coupled to the motor, the vehicle  
11 speed sensor, the accelerator opening detector, and the  
12 brake depression detector, the control unit being  
13 arranged to bring the motor torque to zero when first,  
14 second and third conditions are satisfied wherein the  
15 first condition is that the vehicle speed is lower than a  
16 predetermined speed, the second condition is that the  
17 accelerator opening is substantially zero, and the third  
18 condition is that the brake manipulated quantity is  
19 increasing, and to generate the motor torque according to  
20 the brake manipulated quantity when the brake manipulated  
21 quantity is deceasing.

1 10. A motor torque control system for a vehicle equipped  
2 with a motor, comprising:

3        vehicle speed detecting means for detecting a  
4 vehicle speed;

5        accelerator opening detecting means for detecting an  
6 opening of an accelerator of the vehicle;

7        brake depression detecting means for detecting a  
8 brake manipulated quantity indicative of a depression  
9 state of a brake of the vehicle;

10        first controlling means for bringing a motor torque  
11 of the motor to zero when the vehicle speed is lower than  
12 a predetermined speed, when the accelerator opening is  
13 substantially zero, and when the brake depression state  
14 is set at a braking increasing state of increasing a  
15 braking force of the vehicle; and

16        second controlling means for generating the motor  
17 torque according to the brake manipulated quantity when

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18 the brake depression state is set at a braking decreasing  
19 state of decreasing a braking force of the vehicle.